VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Title

The Title has changed as follows: **METHOD AND DEVICE FOR** TESTING DISK DRIVE HEAD~~S~~ **WHILE DIRECTING GAS ACROSS THE HEAD**

In the Specification

The paragraph at page 3, lines 22-27 has been amended as follows:

Fig. 1A shows a manifold 30 for providing a helium layer between the air bearing surface **20** of a head (or "slider") 12 and the surface **18** of disk 10~~8~~ (Fig. 1; the direction of disk movement is indicated in Fig.1A by the arrow labeled "Disk Velocity".) The manifold 30 is mounted on a Guzik Head Gimbal Assembly (HGA) holder 33. The helium layer 34 (Fig. 2) is localized to the slider-disk boundary layer. The helium is delivered through square tubing 16, e.g., brass tubing. Helium is fed from the lower left (the area labeled "Helium In").

The paragraph at page 4, lines 9-14 has been amended as follows:

Preferably, the flow rate of helium from the manifold is from about 40 to 60 ft^3/hr. If the flow rate is too low, air may be admitted into the helium bearing under the slider, increasing the fly-height. If the flow rate is too high, the pressure of the helium under the slider may increase, increasing the fly-height. Too high a flow rate could also produce more turbulence around the slider resulting in increased N~~n~~on-repeatable R~~r~~un-out (NRRO) which is an inability of the slider to remain perfectly above the track under test.

The paragraph at page 8, lines 15-19 has been amended as follows:

It may be possible to reduce this cost even further. The easiest **approach** would be to reduce the time that the helium is flowing. There are only a few parameters in DET testing that are critically dependeant on flying height. Using the manifold 30, the helium flow can be

isolated to just those tests that are dependent on flying height, reducing consumption to just a few seconds.

In the Claims

The claims have been amended as follows:

1. (Amended) A method of testing a head to be used in a sealed disk drive, comprising directing a flow of a gas across the head **from a source of the gas that is spaced from the head** while subjecting the head to electrical testing.

6. (Amended) The method of claim 1 further comprising causing the gas to flow across the head for a predetermined time substantially equal to the time required for **the** ~~dynamic~~ electrical testing.

8. (Amended) The method of claim 1 wherein the head and equipment used for **the** electrical testing are exposed to the ambient atmosphere.

10. (Amended) The method of claim 8 wherein the head is surrounded by a shroud **while directing the flow of gas and subjecting the head to the electrical testing**.

11. (Amended) A device for testing a head to be used in a sealed disk drive to read/write data of a storage disk, the device comprising:

a manifold having **an** ~~at least one~~ opening for providing a flow of gas from a source of gas;~~,~~

the ~~at least one~~ opening being positioned to direct the flow of gas to a surface of a storage disk positioned adjacent to the head;

the manifold not to be used in the sealed disk drive.

12. (Amended) The device of claim 11 wherein the head and manifold are mounted on a head gimbal assembly **holder not to be used in the sealed disk drive.**

13. (Amended) The device of claim 11 wherein **the** ~~said~~ manifold includes a plurality of apertures extending radially relative to the disk.

14. (Amended) The device of claim 11 further comprising tubing constructed to deliver **the** gas to the manifold.

18. (Amended) A method of testing a head to be used in a sealed disk drive, comprising directing a flow of helium from a manifold across the head, between the head and a disk, while subjecting the head to dynamic electrical testing, **wherein the sealed disk drive excludes the manifold**.

19. (Amended) The method of claim 18 further comprising causing the **helium** ~~gas~~ to flow at a flow rate of from about 40 to 60 ft^3/hr.

20. (Amended) The method of claim 18 further comprising causing the **helium** ~~gas~~ to flow across the head for a predetermined time substantially equal to the time required for **the** dynamic electrical testing.

21. (Amended) The method of claim 18 wherein the manifold comprises an exit through which the **helium** ~~gas~~ flows, and the method further comprises positioning the exit from about 0.005 to 0.010 inch above the surface of a disk that is being used in the **dynamic** electrical testing.

22. (Amended) The method of claims 4 or 18 wherein the manifold comprises a two piece assembly.

23. (Amended) The method of claims 4 or 18 wherein the manifold comprises an angled bore ~~through which the gas flows~~.

Claims 26-60 have been added.

REMARKS

Claims 1-60 are pending. In this Response, claims 1, 6, 8, 10-14 and 18-23 have been amended, and claims 26-60 have been added.

I. TITLE

The Title is required to clearly indicate the claimed invention. Accordingly, the Title has been amended to recite METHOD AND DEVICE FOR TESTING DISK DRIVE HEAD WHILE DIRECTING GAS ACROSS THE HEAD.

Therefore, Applicant requests that this requirement be withdrawn.

II. SECTION 103 REJECTIONS – MIAN AND FREES

Claims 1-25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Mian* (U.S. Patent 5,914,594) in view of *Frees* (U.S. Patent 6,178,059).

Mian discloses a method for characterizing a read head based on the correlation of write-induced magnetic read center shifts and read sensitivity changes in the read head.

Frees discloses a method of writing servo information on a magnetic recording disk. A hard disk drive includes magnetic recording disk 2, cover 3, drive motor 4, read/write head 8, slider 10, actuator 12, rigid arm 14 and suspension 16. Disk 2 is attached to and rotated by drive motor 4. Head 8 is formed on slider 10 which is connected to actuator 12 by rigid arm 14 and suspension 16.

The servo track writing process is performed on a fully assembled hard disk drive. The hard disk drive is substantially enclosed except for an opening in the housing to allow access for pusher 18. The helium is introduced into the housing with a positive low volume flow of helium through a hole in cover 3. The servo track writing process includes rotating disk 2, aerodynamically floating head 8 in a helium atmosphere, and writing servo tracks from head 8 to disk 2. During the servo track writing, pusher 18 contacts rigid arm 14 and positions and holds slider 10 at the proper location.

Claim 1 recites "A method of testing a head to be used in a sealed disk drive, comprising directing a flow of a gas across the head from a source of the gas that is spaced from the head while subjecting the head to electrical testing."

Mian in view of *Frees* fails to teach or suggest this approach. Even if *Mian* was modified to perform the read head characterization by aerodynamically floating the read head in a helium atmosphere introduced into the housing as taught by *Frees*, the proposed modification would not meet the claim limitations of "directing a flow of a gas across the head from a source of the gas that is spaced from the head." That is, the helium atmosphere would be introduced into the housing, and then the read head characterization would occur. Thus, the helium would not be directed across the head from a source of helium that is spaced from the head.

Claim 11 recites "A device for testing a head to be used in a sealed disk drive to read/write data of a storage disk, the device comprising: a manifold having an opening for providing a flow of gas from a source of gas; the opening being positioned to direct the flow of gas to a surface of a storage disk positioned adjacent to the head; the manifold not to be used in the sealed disk drive."

Mian in view of *Frees* fails to teach or suggest this approach. Even if *Mian* was modified to perform the read head characterization by aerodynamically floating the read head in a helium atmosphere introduced into the housing as taught by *Frees*, the proposed modification would not meet the claim limitations of "a manifold having an opening for providing a flow of gas from a source of gas; the opening being positioned to direct the flow of gas to a surface of a storage disk positioned adjacent to the head; the manifold not to be used in the sealed disk drive." That is, the helium atmosphere would be introduced into the housing through a hole in the housing cover. Thus, the helium would not be directed to a surface of a storage disk through an opening in a manifold that is not used in the disk drive.

Claim 18 recites "A method of testing a head to be used in a sealed disk drive, comprising directing a flow of helium from a manifold across the head, between the head and a disk, while subjecting the head to dynamic electrical testing, wherein the sealed disk drive excludes the manifold."

Mian in view of *Frees* fails to teach or suggest this approach. Even if *Mian* was modified to perform the read head characterization by aerodynamically floating the read head in a helium atmosphere introduced into the housing as taught by *Frees*, the proposed modification would not meet the claim limitations of "directing a flow of helium from a manifold across the head, between the head and a disk, while subjecting the head to dynamic electrical testing, wherein the sealed disk drive excludes the manifold." That is, the helium atmosphere would be introduced into the housing through a hole in the housing cover. Thus, the helium would not be directed from a manifold that the disk drive excludes across the read head and between the read head and the disk while characterizing the read head.

In sustaining these rejections, the Examiner asserts that "It would have been obvious to use helium gas as claimed with the method of Mian in view of the teaching of Frees." Even assuming, for the sake or argument, that *Mian* was modified in accordance with *Frees*, the proposed modification, as mentioned above, would not meet the claim limitations of independent claims 1, 11 and 18.

The dependent claims recite numerous limitations that patentably distinguish over *Mian* in view of *Frees*. Some but not all of these limitations are discussed below.

Claim 5 recites "causing the gas to flow at a flow rate of from about 40 to 60 ft^3/hr." Claim 19 recites similar limitations. *Mian* in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about the helium atmosphere flowing into or out of cover 3 during the servo track writing, much less the flow rate of the helium atmosphere during the servo track writing. In sustaining this rejection, the Examiner merely asserts that these "details are considered obvious design considerations well within the capabilities of one skilled in the art." Unfortunately, the Examiner has not even attempted to explain how or why this feature would be an obvious design consideration in *Frees*.

Claim 6 recites "causing the gas to flow across the head for a predetermined time substantially equal to the time required for the electrical testing." Claim 20 recites similar limitations. *Mian* in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about causing the helium atmosphere to flow across head 8 (or slider 10) for a

substantially equal time as the servo track writing. In sustaining this rejection, the Examiner merely asserts that these "details are considered obvious design considerations well within the capabilities of one skilled in the art." Unfortunately, the Examiner has not even attempted to explain how or why this feature would be an obvious design consideration in *Frees*.

Claim 7 recites "the manifold comprises an exit through which the gas flows, and the method further comprises positioning the exit from about 0.005 to 0.010 inch above the surface of a disk that is being used in the electrical testing." Claim 21 recites similar limitations. *Mian* in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about a manifold, much less a manifold with a gas exit positioned from about 0.005 to 0.010 inch above the surface of disk 2. In sustaining this rejection, the Examiner merely asserts that these "details are considered obvious design considerations well within the capabilities of one skilled in the art." Unfortunately, the Examiner has not even attempted to explain how or why this feature would be an obvious design consideration in *Frees*. Furthermore, even assuming, for the sake or argument, that the hole in cover 3 is considered a manifold exit, positioning the hole from about 0.005 to 0.010 inch above disk 2 would render the disk drive inoperative.

Claim 10 recites "the head is surrounded by a shroud while directing the flow of gas and subjecting the head to the electrical testing." *Mian* in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about a shroud that surrounds head 8 (or slider 10) during the servo track writing. In sustaining this rejection, the Examiner merely asserts that these "details are considered obvious design considerations well within the capabilities of one skilled in the art." Unfortunately, the Examiner has not even attempted to explain how or why this feature would be an obvious design consideration in *Frees*. Furthermore, a shroud that surrounds head 8 or slider 10 would disrupt the internal aerodynamics and render the disk drive inoperative.

Claim 14 recites "tubing constructed to deliver the gas to the manifold." *Mian* in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about a manifold, much less tubing that delivers the helium to the manifold. In sustaining this rejection, the Examiner merely asserts that these "details are considered obvious design considerations well within the capabilities of one skilled in the art." Unfortunately, the Examiner has not even attempted to explain how or why this feature would be an obvious design consideration in *Frees*.

Furthermore, even assuming, for the sake or argument, that cover 3 is considered a manifold, *Frees* fails to teach or suggest that tubing delivers the helium through cover 3 during the servo track writing.

To establish a prima facie case of obviousness (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations (M.P.E.P. § 2143). See also *C.R. Bard, Inc. v. M3 Systems, Inc.*, 157 F.3d 1340, 1351 (Fed. Cir. 1998).

It is insufficient that the prior art shows similar components unless it also contains some teaching, suggestion or incentive for arriving at the claimed structure. See *Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir. 1990).

Moreover, if the proposed modification would render the prior art unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification (M.P.E.P. § 2143.01).

Therefore, Applicant requests that these rejections be withdrawn.

III. OTHER AMENDMENTS

The Specification and Claims have been amended to improve clarity. No new matter has been added.

IV. NEW CLAIMS

Claims 26-60 have been added to clarify and explicate various features of the invention. No new matter has been added.

Claim 26 recites "directing a gas at the disk while rotating the disk such that the gas is dragged across the head between the head and the disk and while electrically testing the head using the disk."

Mian in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about directing the helium at disk 2 during the servo track writing. Claims 27-40 depend from claim 26.

Claim 41 recites "directing helium through tubing at the disk surface while rotating the disk such that the disk rotation drags the helium across the air-bearing surface between the air-bearing surface and the disk surface and while dynamically electrically testing the head using the disk."

Mian in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about directing the helium at disk 2 during the servo track writing, much less directing the helium through tubing during the servo track writing. Claims 42-50 depend from claim 41.

Claim 51 recites "directing helium at the disk surface from a gas source that remains external to the disk drive while rotating the disk such that the disk rotation drags the helium across the air-bearing surface between the air-bearing surface and the disk surface and while dynamically electrically testing the head using the disk."

Mian in view of *Frees* fails to teach or suggest this approach. In particular, *Frees* says nothing about directing the helium at disk 2 during the servo track writing, much less directing the helium from a gas source that remains external to the disk drive during the servo track writing. Claims 52-60 depend from claim 51.

V. CORRESPONDENCE ADDRESS

A Change of Correspondence Address (copy attached) was filed on January 28, 2003, and the return postcard (copy attached) establishing receipt of same by the Patent Office was date stamped on February 6, 2003. However, the outstanding Office Action was sent to the previous correspondence address. Applicant requests that future correspondence be sent to the new correspondence address.

VI. ATTORNEY DOCKET NUMBER

A Request for Corrected Filing Receipt (copy attached) was filed on January 28, 2003, and the return postcard (copy attached) establishing receipt of same by the Patent Office was date stamped on February 6, 2003. The Request changed the attorney docket number. However, a corrected filing receipt has not been received, and the outstanding Office Action used the previous attorney docket number. Applicant requests that future correspondence use the new attorney docket number.

VII. FEES

The fee is calculated below:

For	Claims Remaining After Amendment	Highest Number Previously Paid For		Extra Claims	Rate		Additional Fee
Total Claims	62	- 27	=	35	x $18	=	$630
Independent Claims	6	- 3	=	3	x $84	=	$252
Multiple Dep. Claim	1	1			$280	=	$0
Total Fee						=	$882

Please charge the $882 fee and charge any underpayment and credit any overpayment to Deposit Account No. 13-0016/Q01-1050-US1.

VIII. CONCLUSION

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May 20, 2003.

D Sigmond — 5/20/03

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Date of Signature

Respectfully submitted,

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